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## A REVIEW ON APPLICATIONS OF UAV-BASED REMOTE SENSING FOR MAPPING SALINE AND WATERLOGGED SOILS: ADVANCES, CHALLENGES, AND FUTURE DIRECTIONS

**Parteek<sup>1\*</sup>, Mukesh Kumar<sup>1</sup>, Pratibha<sup>1</sup>, Ajay<sup>1</sup>, Kapil<sup>1</sup> and Amandeep Singh<sup>1</sup>**

*Department of Soil and Water Engineering, CCS HAU Hisar*

*Email: [parteekdhull9029@gmail.com](mailto:parteekdhull9029@gmail.com)*

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**Abstract:** Soil plays an important role in addressing global environmental concerns, underlining the impacts of climate change, food and water security, land degradation, and habitat loss for various species. Soil salinity and waterlogging are among the most widespread forms of land degradation, posing serious threats to agricultural productivity, ecosystem stability, and global food security. High soil salinity and water logging reduces crop productivity and degrade soil structure, creating a need for their monitoring and management. The conventional method of soil sampling and groundwater observations yield reliable information at individual locations, their usefulness for mapping soil salinity and waterlogging is limited by sparse spatial coverage, high operational costs, and infrequent data collection. These constraints make it difficult to adequately represent the spatial complexity and rapid temporal changes associated with salinity and waterlogging processes. Nowadays, UAV-based remote sensing overcomes these limitations by providing high-resolution, spatially continuous, and timely information, enabling more accurate delineation and monitoring of affected areas. These platforms offer a more effective approach for accessing soil salinity and waterlogging by using different type of UAV sensor and increase the accuracy of results.

**Keywords:** UAV remote sensing, Hyperspectral imaging, Multispectral imaging

## ANGIOSPERMIC PLANT DIVERSITY OF VIKRAMSHILA GANGETIC DOLPHIN WILDLIFE SANCTUARY, BHAGALPUR, BIHAR (INDIA)

**Onkar Nath Maurya<sup>1\*</sup> and Tanay Shil<sup>2</sup>**

*Botanical Survey of India, CGO Complex, 3<sup>rd</sup> MSO Building, Block F, 5<sup>th</sup> Floor, DF Block, Sector 1, Salt Lake City, Kolkata-700064*

*<sup>2</sup>Central National Herbarium, Botanical Survey of India, Howrah-711103, West Bengal, India*

*Email: [onmaurya@bsi.gov.in](mailto:onmaurya@bsi.gov.in)*

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**Abstract:** This study presents the first comprehensive survey of flowering plant diversity within the Vikramshila Gangetic Dolphin Wildlife Sanctuary, situated in Bhagalpur district, Bihar, India. The investigation documents 163 species of angiosperms representing 138 genera and 51 families, along with details on their habits and phenological periods.

**Keywords:** Vikramshila Gangetic Dolphin Wildlife Sanctuary, Floristic diversity, Angiosperms

## OPTIMIZING VEGETATIVE PROPAGATION OF THE ENDANGERED MEDICINAL HERB *VALERIANA JATAMANSI* JONES THROUGH NAPHTHALENE ACETIC ACID (NAA)

**Aftab Ahmed, Suhail Shabir, Mubashir Ahmad Mir, Mohsin Bashir, Arzan Nazir and Amarjeet Singh\***

*Division of Forest Products and Utilization, Faculty of Forestry, Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, Srinagar, J&K, India*

Email: [amerjeetskuast@gmail.com](mailto:amerjeetskuast@gmail.com)

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**Abstract:** *Valeriana jatamansi* Jones, commonly known as Indian Valerian, is a critically endangered medicinal herb in the Himalayan region due to habitat loss and the overexploitation of its aromatic rhizomes for pharmaceutical use. Traditional propagation methods via seeds and rhizome division are often inefficient, characterized by poor viability and germination rates having slow growth cycle. To address this, a study was conducted at the SKUAST-K Faculty of Forestry using a hydroponic-style system with apical cuttings treated with Naphthalene Acetic Acid (NAA) at various concentrations. The methodology involved maintaining cuttings in transparent glass beakers filled with distilled water, which was changed every two days to ensure proper oxygenation and hygiene. The research findings demonstrated that a low-concentration auxin treatment of 50 ppm NAA for a 30-minute duration (T1D1) was the most effective protocol, achieving a 100% rooting success rate. This treatment produced significantly superior results across all quantitative parameters, including an average of five roots per cutting and the average root diameter of 0.271 cm. In contrast, higher concentrations of 100 ppm and 150 ppm led to physiological stress, resulting in leaf chlorosis, tissue necrosis, and a sharp decline in rooting success. This simple and reliable vegetative propagation technique offers a scalable solution for producing high-quality, uniform planting material, supporting the urgent need for the conservation and sustainable cultivation of this endangered species.

**Keywords:** *Valeriana jatamansi*, stem cuttings, NAA, Rooting, Medicinal Plants, Kashmir

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## EFFECT OF CROP GEOMETRY AND IRRIGATION FREQUENCY ON YIELD AND RESOURCE USE EFFICIENCY OF OKRA UNDER DRIP IRRIGATION

Nayan Kumar<sup>1</sup>, Mukesh Kumar<sup>2\*</sup>, Ram Naresh<sup>2</sup>, Kapil<sup>2</sup>, Kuldeep Singh<sup>2</sup> and Amandeep Singh<sup>2</sup>

<sup>1,2</sup>Department of Soil and Water Engineering, CCS HAU, Hisar

Email: [mukeshdandi@yahoo.com](mailto:mukeshdandi@yahoo.com)

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**Abstract:** A field experiment was conducted during the summer season at the research farm of CCS Haryana Agricultural University, Hisar, to evaluate the effects of crop geometry and irrigation frequency on yield, irrigation water use efficiency (IWUE), and fertilizer use efficiency (FUE) of okra (*Abelmoschus esculentus* L.). The experiment was arranged in a split-plot design with three replications. Two crop geometries were assigned to main plots: normal geometry (plant spacing 30 cm, row spacing 45 cm, and lateral spacing 45 cm with one lateral per crop row) and paired-row geometry (plant spacing 30 cm, paired rows at 30 cm with 90 cm spacing between pairs and one lateral for each pair of rows). Four irrigation frequencies viz. daily irrigation, alternate-day irrigation, irrigation after three days, and irrigation after five days—were allotted to subplots. Crop geometry and irrigation frequency significantly influenced yield and resource use efficiencies. Normal geometry with daily irrigation produced the highest total yield (114.98 q ha<sup>-1</sup>), IWUE (5.68 kg m<sup>-3</sup>), and FUE (54.76 kg kg<sup>-1</sup>), whereas the lowest values of yield (94.86 q ha<sup>-1</sup>), IWUE (4.68 kg m<sup>-3</sup>), and FUE (45.17 kg kg<sup>-1</sup>) were observed under paired-row geometry with irrigation after five days. Overall, normal geometry resulted in higher average yield (106.74 q ha<sup>-1</sup>) than paired-row geometry (102.85 q ha<sup>-1</sup>). Similarly, daily irrigation recorded the highest mean yield (113.86 q ha<sup>-1</sup>), IWUE (5.62 kg m<sup>-3</sup>), and FUE (54.22 kg kg<sup>-1</sup>), followed by alternate-day irrigation, irrigation after three days, and irrigation after five days.

**Keywords:** Irrigation water use efficiency, fertilizer use efficiency, paired row geometry

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## EFFECT OF CLUSTER FRONT LINE DEMONSTRATIONS ON ENHANCEMENT OF YIELD AND ECONOMICS OF MUSTARD CULTIVATION IN DIDWANA-KUCHAMAN DISTRICT OF RAJASTHAN

A.S. Jat<sup>\*1</sup>, S.D. Bamboriya<sup>2</sup> and S.R. Kumawat<sup>3</sup>

<sup>1</sup>Krishi Vigyan Kendra, Maulasar, Nagaur-II, Agriculture University, Jodhpur

<sup>2</sup>Department of Agronomy, SKNAU, Jobner, (Rajasthan)

<sup>3</sup>Directorate of Extension Education, Agriculture University, Jodhpur, Rajasthan, India

Email: [dr.asjat@gmail.com](mailto:dr.asjat@gmail.com)

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**Abstract:** Under centrally sponsored programme on oilseed production technology under NFSM schemes, KVK Maulasar conducted 815 demonstrations on different variety of mustard during *Rabi*, 2016-17 to 2023-24. The critical inputs were identified in existing production technology through discussion with farmers and on the basis of soil sampling. Lack of plant protection measures were the predominant identified causes of low productivity of oilseed crop in district Didwana-Kuchaman of Rajasthan. In the same sequence the other parameters like technological impact, economical impact and extension gap were analyzed for impact assessment of cluster frontline demonstrations (CFLDs) on mustard crop. The results of eight consecutive years study revealed that the average yield under demonstration plots was obtained 17.26 q/ha as compared to 14.63 q/ha in farmer plots with average 18.10 % increase in yield. The average technology gap, extension gap & technological index were found 636 kg/ha, 264 kg/ha and 26.93 percent, respectively. Further, data showed that the average additional cost of cultivation (Rs. 2011/ha) under integrated crop management demonstrations and has fetched additional net returns of Rs. 10896 per hectare with incremental benefit: cost ratio of 0.26. The results clearly indicate the positive effect of CFLDs over the existing practices.

**Keywords:** Economic analysis, Extension gap, Frontline demonstration, Mustard, Yield